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Evaluation frequency and evaluator's experience: the case of venture capital investment firms and monitoring intensity in stage financing

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Abstract In this paper we analyze the relation between an investor's experience and the intensity of monitoring activities. Specifically, we consider venture capitalist firms and their choices of time intervals between financing rounds. We hypothesize that more industry investment experience leads to longer time intervals between financing rounds and hence, lower monitoring intensity. Using a unique data set of venture capital firms from Germany during the period from 1995 to 2005 we find evidence for our hypothesis that in a given time frame more experienced investors evaluate and monitor their investments less often than less experienced investors. In addition, VC investors pool their experience and share the risk involved in investing by forming syndicates which reduces the incentives to monitor subsequently. On the basis of our results we argue that the optimal frequency of performance evaluations should take into account the experience of the evaluator.

Keywords Experience · Investment evaluation · Evaluation frequency · Monitoring · Governance · Venture capital

1 Introduction

In this paper we analyze governance modes in entrepreneurial financing in relation to the investment experience of the VC(s). In particular, we focus on the frequency

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and intensity of monitoring activities of venture capitalists. Following Gompers (1995), we operationalize monitoring as the interval between financing rounds that lead to subsequent continuation/abandonment decisions. Our unique sample consists of 2,373 VC transactions in Germany during the period of 1995–2005. Therefore, the relevant institutional setting is kept constant. We investigate how principal-specific characteristics and transaction-specific effects jointly affect the monitoring activities. The principal-specific characteristics include technological, financial, and managerial expertise and we proxy them by industry experience of the involved VCs. More industry experience increases the ability to screen business proposals and to offer high quality advice to entrepreneurs (Brander et al. 2002). The principal (the VC) accounts for his idiosyncratic as well as transaction-specific characteristics when deciding on the interval between distinct points in time to monitor and control the agent (the entrepreneur). Moreover, this length of a project evaluation period is likely to be influenced by the availability of partner VCs too, because they add resources to those of the lead VC creating mutual benefits that allow for better screening of investment, risk sharing, a higher value-added to the venture and likely, lower incentives to monitor. Hence, our second objective is to analyze how the incentives to monitor are affected by the addition of partner VCs.

By introducing into the analysis resources and capabilities that are specific to the VCs, our study provides insights into how VC resources and capabilities together with transaction-specific characteristics jointly determine the governance implemented in VC financing through which VCs safeguard their investments. Previous work (among others, Gompers (1995) or Li (2008)) analyzes how transaction-specific or agent-specific factors impact monitoring intensity in entrepreneurial financing. In addition, this paper combines the previous research on staging and monitoring patterns with an analysis of VC syndication (the involvement of a partner VC) strategies, and documents how these strategies enable VCs to combine their pertinent industry experience. The combination enhances their ability to monitor entrepreneurial progress and exert weaker governance to control and discipline the entrepreneurs. We explicitly focus on VC industry experience and syndication strategies and deal with potential endogeneity and self-selection issues empirically. The results show that VCs with higher levels of industry experience are better at managing their relationships with their portfolio companies and exert less stringent governance which contrasts the finding in Sapienza et al. (1996). VCs with more industry experience monitor their portfolio firms less frequently and let entrepreneurs work with the money provided for a longer period of time. In addition, we also find that adding partner VCs to a deal, i.e., the syndication of an investment project, also increases the time interval between financing rounds and thus leads to less intense monitoring. This effect pertains to first and later round syndication, providing evidence for both, risk sharing and value-adding motives that decrease the incentives to monitor the agent.

The paper proceeds as follows. Section 2 provides the theoretical background and develops the hypotheses for empirical testing. Section 3 presents the dataset and provides the descriptive statistics along with definitions of variables. Section 4 reports the estimation results and discusses implications of the findings. Section 5 summarizes and considers limitations and potential extensions.

2 Theory and hypotheses

Venture capital (VC[1]) financing takes place in emerging and knowledge-intensive industries where the value of the funded projects is highly uncertain and future payoffs are distant. The difficulty of disentangling the contribution of individual activities gives substantial leeway to the entrepreneur. As a consequence, despite contingent contracts between VCS and entrepreneur, the contracts are inherently incomplete (Kaplan and Strömberg 2001, p. 427, Tian 2010), and the entrepreneur may defect without being detected (Gompers 1995; Gompers and Lerner 2002; Kuckertz and Kollmann 2010; Payne et al. 2009). Accordingly, to effectively deal with the information asymmetry it is important to implement suitable governance mechanisms, and in particular to monitor the effort and activities of the entrepreneur closely. Consequently, the mechanisms may include, among others, influencing incentive structures to mitigate the agency problem between owners and managers, the provision of funds in several stages, or choosing a strict or loose monitoring policy, or any combination thereof (Tian 2010). Campbell and Frye (2009) show that in VC-backed firms, monitoring levels are higher than those in non-backed firms at the time of and shortly after an initial public offering. Similarly, Hellmann and Puri (2002) find that VC financing goes hand in hand with the adoption of stock option plans to incentivize entrepreneurs.

More importantly, the practice of VCs to provide their investment in several increments limits both downside exposure and opportunistic behavior by the entrepreneur (Gompers 1995; Holmstrom 1979; Leiblein and Miller 2003; Mayer and Salomon 2006). Monitoring the entrepreneur through the provision of financing in several rounds and making subsequent continuation/abandonment decisions aims at reducing agency problems between VCS and the funded firm (Gompers and Lerner 2002); it specifically focuses on reducing information asymmetries between the involved parties. According to theoretical work by Bergemann and Hege (1998), monitoring improves efficiency in VC financing though monitoring per se does not predict failure or success of VC-backed firms (Abdou and Varela 2009).

The frequency and intensity of monitoring depends on several factors. First of all, and intuitively compelling, VC monitoring and contractual terms interact with each other (Kaplan and Strömberg 2004). Besides contractual arrangements, characteristics of the funded firm and the VCS determine monitoring frequency and intensity. For example, following Gompers (1995), VCs react with higher monitoring frequency to increases in expected agency costs stemming from entrepreneurial—or transaction-specific factors. Turning to VC characteristics, experienced VCs rely on more intense monitoring than less experienced VCs (Campbell and Frye 2009).[2] In part contrary to this, Sapienza et al. (1996) find that more experience in the VC industry leads to less monitoring, but more experience in the transaction-specific industry again leads to more monitoring.[3]

[1] In what follows, we refer to venture capital and venture capitalist as VCs.

[2] Campbell and Frye (2009) distinguish high quality and low quality VCs, where quality refers to VC firm age. The proxy for quality is backed by Ivanov et al. (2011) who identify reputation of VCs as a critical success factor.

[3] Trust may also reduce the intensity of monitoring as the former represents a substitute for the latter (Duffner et al. 2009).

Another factor very likely to be relevant for the choice of monitoring is (the quality of) accounting information provided by the funded firm.[4] For obvious reasons checking on accounting numbers represents one part of the VC's investment evaluation process (Wright and Robbie 1997). International differences in the value assigned to accounting information exist (Manigart et al. 2000) and they may be due to VCs who are more or less financially oriented (Sapienza et al. 1996) or due to the unequal quality of accounting standards prevalent in different countries (Jeng and Wells 2000).[5] In the process of VC financing the accounting system of the funded firm itself evolves and professionalizes (Mitchell 1997) and this allows for more frequent monitoring of the investee later on (Mitchell et al. 1995), hence improving the accuracy of subsequent continuation/abandonment decisions. Another aspect in this accounting context relates to the VC's expertise in analyzing and interpreting accounting information of the funded firm. Cardinaels (2008) and McDaniel et al. (2002) demonstrate that the level of accounting knowledge influences how well accounting information is processed or evaluated. As the level of expertise likely increases in the VC's industry experience, VCs with more industry experience may benefit more than less experienced VCs from otherwise identical information and therefore decreases the incentives to monitor subsequently.

2.1 Investment experience and governance choice

The choice of a governance mode in VC financing constitutes a means to affect the costs of monitoring and administering a transaction (Leiblein 2003; Williamson 1975; Williamson 1985). VCs finance entrepreneurs in discrete stages, and periodically check up on the venture's progress (Payne et al. 2009; Tian 2010). By sequencing investment decisions, VCs can leverage the upside of the venture while retaining the ability to terminate the investment when prospects become unfavorable. Gompers (1995) reasons that the duration of financing rounds (the time between injections of capital) proxies for the intensity of monitoring. The shorter the duration of the financing rounds, the more frequent the VCs' monitoring activities. Kaplan and Strömberg (2004) point out that by providing less funding in a given round and shortening the time until the next financing round, the venture capitalist increases his or her ability to liquidate the venture if its performance is unsatisfactory (Folta 1998; Kuckertz and Kollmann 2010; Tian 2010). An important indicator to this end constitutes accounting information of the funded firm.[6] And if VCs demand more frequent interim reports and possibly accompanying explanations from the funding firm to evaluate its performance, the shorter time between reports can be interpreted as more intense monitoring.

Williamson (1985, 1975) argues that the crucial question is not what is the best governance structure given the characteristics of a particular transaction, but rather

[4] See Bushman and Smith (2001) for a review on accounting information and corporate governance.

[5] In Jeng and Wells (2000), the effect of accounting standards' quality on VC financing is not in the predicted direction though.

[6] In the corporate context, Bushman and Smith (2001), p. 292f) argue that "financial accounting information in corporate governance mechanisms is one channel by which financial accounting information potentially enhances the investment decisions".

what governance structure is most suitable for a venture capital firm (with certain characteristics) organizing a transaction (with its own characteristics). If the members of the VC firm have relevant industry investment experience, this experience can mitigate the detrimental effects of transaction-specific disadvantages like technological uncertainty and lack of collateral. While it is costly in terms of time and resources for VCs to acquire and interpret information concerning the underlying venture and to predict future progress, VC-specific capabilities can attenuate uncertainty and reduce information asymmetries. Here, VCs' industry experience is comparable to the technological capabilities in Mayer and Salomon (2006), who argue that the possession of stronger technological capabilities improves a firm's ability to govern transactions. The existence of superior firm-level resources and capabilities, gained through continuous investment into the transaction relevant industry, negatively affects the ultimate drivers of transaction costs, namely contractual hazards (Leiblein and Miller 2003; Leiblein 2003).

VCs appraise accounting information provided by (to be) funded firms in their decision process (Wright and Robbie 1997). The VCs can choose the frequency of evaluating that information or, respectively, the interval length between two evaluations. Recent work in analytical accounting research analyses the optimal frequency of performance evaluation and shows that more frequent evaluations, i.e. shorter evaluation periods, may not be optimal for efficient incentive provision under all circumstances (Arya et al. 2004; Lukas 2010; or Nikias et al. 2005).[7] To the best of our knowledge, all these analyses emanate from the principal's full rationality. Hence, effects of acquiring better information processing capability through experience cannot occur.[8] Empirical research, however, shows that learning may well take place (Ryan et al. 2009). Financial reporting often presents data in the form of numbers in tables. Following Cardinaels (2008), this format is better suited for individuals with comparably more accounting knowledge. In similar vein, McDaniel et al. (2002) conclude that accounting experts do better in evaluating financial reporting quality than accounting literates. In both studies, the same information in substance leads to different evaluations of it with experts holding an edge over accounting literates. Given that VCs acquire expertise in judging accounting information of their funded firms over time through continuous investments and corresponding monitoring activities, VCs with more industry experience should benefit (ceteris paribus) more from otherwise identical information.[9] This would allow them to reduce the frequency of interaction with the entrepreneur, expand the evaluation periods and thus apply less strict forms of governance to save on monitoring costs.

Transaction-relevant industry experience, which often includes an understanding of the technology at work, allows VCs to better assess entrepreneurs' abilities, select good deals and define roles and responsibilities. In addition, VCs with more industry

[7] Less frequent evaluations curb the agent's opportunism when selecting subsequent acts.

[8] If a group of individuals determines the VC decision other issues related to the experience of its members may arise like cognitive conflict or differences between presence and use of knowledge (Forbes and Milliken 1999).

[9] In addition to being able to better interpret identical evaluation, more experienced VCs cater for even better quality of accounting information than less experienced ones (Agrawal and Cooper (2010)).

experience should be better able to identify milestones, determine appropriate financial incentives, share knowledge to create value, mitigate risks, and monitor progress. And finally, industry experience should also help to better interpret accounting information, to understand new information relevant to continuation or abandonment decisions, and, at least to some degree, to prevent slacking. All these effects can make less protective forms of governance possible and reduce the incentives to monitor the entrepreneur more closely. The decision about monitoring intensity therefore depends on transaction and VC-specific characteristics alike (Nielsen 2010; Ness and Haugland 2005). The intensity of monitoring in VC financing should be influenced by the VCs' investment experience, and the VCs should leverage their idiosyncratic industry experience to allow for less monitoring intensity (ceteris paribus). Based on the arguments discussed we formulate Hypothesis 1.

Hypothesis 1 With more industry investment experience, VCs can more effectively monitor projected entrepreneurial progress. Hence, the interval between financing rounds increases.

2.2 Syndication and governance choice

Internal firm resources are important for acquiring and sustaining competitive advantages. If they lack, alternative ways to generate and access knowledge become necessary (Pfeffer and Salancik 1978). Inter-organizational relationships can create value by allowing firms to combine resources and share knowledge for mutual gain.

Collaboration among multiple VCs presents an enhanced opportunity for learning and resource sharing as well as the spreading of financial risks involved with the financing of new ventures. In sum, it helps each of the VCs to reduce the level of uncertainty they face when financing risky ventures. Generally, the need for additional partner skills is anticipated to be greater in later stages of an investment than in earlier stages. This is mainly due to the fact that more mature firms funded already have an established management structure and market position (Bygrave 1987; Bygrave and Timmons 1992; Lockett and Wright 1999; Brander et al. 2002; Hopp 2010; Hopp and Lukas 2012). Consequently, the advice becomes more specific and context-dependent in later rounds while it is rather general (i.e., it addresses basic management topics) in earlier rounds.[10] Hence, with every round, the ambiguity and uncertainty of the project decreases. This allows for improved judgment about the managerial advice needed to support the funded firm (Lerner 1994). If more than one VC is involved in the screening process before a continuation/abandonment decision is about to be made, the evaluation of the venture proposal becomes more efficient and reduces the potential danger of adverse

[10] Hellmann and Puri (2002), for example, find that VC financing goes hand in hand with institutionalizing human resource management or with the adoption of stock option plans, and Mäkelä and Maula (2005) report effects on internationalization strategies. Moreover, in the process of VC financing, the accounting system of the funded firm itself develops, and this allows for more frequent monitoring of the investee once the portfolio firm matures (Mitchell et al. 1997). Arguably, all of these activities become more important in later stages, when uncertainty about the entrepreneur and the firm's prospects are at least partially resolved (Hopp and Lukas 2012).

selection (Brander et al. 2002; Lerner 1994; Jaeger and Tohuy 2011; Cumming 2006). Given that different VCs independently acquire expertise in interpreting accounting information of funded firms, pooling the expertise in a syndicate should benefit the parties involved. This follows from the arguments in Cardinaels (2008) and McDaniel et al. (2002) that financial reports are better utilized by individuals with sophisticated accounting knowledge. The potential advantage from pooling expertise, however, follows also from the variance reducing effect of observing another informative signal (Holmstrom 1979). Each syndicate member evaluates available information and "produces" an informative signal about the prospects of the funded firm. As long as the costs of adding another partner to the syndicate are lower than the benefits derived from the added expertise, syndication is beneficial and will require less frequent interactions and hence, less intense monitoring of the funded firm.

Of course, partners contribute financial resources in every round. Yet the need to add specific knowledge and expertise grows over time. Consistent with this argument, during initial rounds of funding, empirical evidence highlights the role of risk-sharing among the VCs involved in a syndicate (Manigart et al. 2005; Hopp and Rieder 2011). As VC financing takes place in emerging and knowledge-intensive industries, the difficulty of disentangling the contribution of individual activities gives substantial leeway to the entrepreneur exacerbating the problem of adverse selection and asymmetric information for investments in very early stages of a firm′s life. Hence, in earlier rounds VCs aim to share the financial burden and they syndicate to spread risks.[11] Risk sharing might imply a weaker incentive to monitor and, in turn, increases the time between financing rounds. In sum, the incentive to monitor the entrepreneur is influenced by the (likely) combination of industry experience brought about by syndication among VC partners and the level of risks VCs face upon investing. First round syndication decreases the financial exposure, and hence, decreases the incentives to monitor the entrepreneur more frequently. Consequently, the length of financing rounds increases. Moreover, in later rounds syndication can provide missing knowledge and helps to overcome a lack of industry investment experience. Accessing the industry experience of a number of partners can help to mitigate a potential shortage of resources, leading to better advice and improved continuation or abandonment decisions. Again the length between financing rounds increases. All in all, both the need to spread financial risks and the need to involve partner skills cause lower incentives to subsequently monitor the firm. Hence, generally, syndication should (in early and later rounds) be associated with lower monitoring intensity, regardless of the underlying motive that is causing firms to syndicate in the first place. To sum up, we posit that syndication (in early and later rounds) should be associated with longer time intervals between subsequent capital provisions. We therefore formulate Hypothesis 2.

[11] Moreover, if the size of the round increases, the general likelihood of VCs to be collaborating increases correspondingly, in order to reduce the financial burden for the individual VC participating (Manigart et al. 2005). This implies that when the size of funding increases, more partners are generally involved. We thank an anonymous reviewer for pointing to this effect, and refer to it explicitly in our empirical section.

Hypothesis 2 Syndication pools industry investment experience and reduces the risk of investing and consequently lowers the incentives for VCs to monitor the financed firm. Consequently, intervals between financing rounds increase.

3 Methodology

3.1 Research design and data description

The sample consists of 2,373 venture capital financing events in Germany within the period 1995–2005. This total number comprises capital injections from 447 VCs, made over different stages (Start Up, Early Stage and Late Stage), into 964 firms. On average, each firm received financing 2.2 times during the investigation period. This result implies that either a firm has received financing 2.2 times from the same VC (in subsequent rounds) or by 2.2 VCs on average (in either subsequent rounds or in the same round).

The transactions were compiled by using public sources and the Thomson Venture Economics (TVE) Database. We identify the involved parties in each transaction and the corresponding information on the VCs along with the funded firms. The result is a deal survey exhibiting who funded a new company and who was joined by which partner. Moreover, we collect information about each financing round to infer which VC made an investment into a target firm at which point in time. In addition we supplement the database with information regarding the VCs and the funded firms, along with information specific to each deal. The analysis is carried out on the basis of investment rounds as indicated by TVE. A distinction between milestone (financing provided in tranches contingent upon reaching distinct milestones, such as revenues achieved, patents filed etc.) and round financing (no pre-determined commitment to provide tranches of financing) cannot be observed. Gompers and Lerner (2002) study the completeness of the TVE database, and argue that most VC investments are contained in it, and that those missing are among the less significant ones. The sample resembles the aggregate statistics published by the German Venture Capital and Private Equity association and comparable representative studies in terms of industries and stages studied (see among others BVK (2005), Bascha and Walz (2007), Mayer et al. (2005)). Our sample is therefore unlikely to suffer from sample selection bias by focusing on TVE data.

The focus on the underlying German data has the advantage that we can study VC decision making with respect to monitoring frequency and intensity from the inception of Germany's Neuer Markt—the growth stock segment at the Frankfurt stock exchange—in 1997 until the closure of it in 2003. Up to 300 firms were taken public until 2000. The inception of the market saw a paralleling increase in VC investments and towards the closure of the Neuer Markt in 2003 a corresponding decline in VC transactions was observed (von Kalckreuth and Silbermann 2010). Given the growing focus of investment into these high-risk ventures and a lack of comparable investment histories (unlike in more established markets in other countries), the task of disentangling the role of industry investment experience (alone and in combination) and syndication activities is not obscured by longer-

lasting networks of VC investments, as evidenced by the work of Hochberg et al. (2007, 2010). And notwithstanding differences between the US VC market and the ones in Germany and Europe as a whole, it is interesting to note that the study by Bottazzi et al. (2004) covering the years 1998–2001 (which are included in our sample) found that European VC firms were "increasingly emulating US investment practices" and had established links to the US; furthermore, over a third of European VC had worked in the US before. Therefore, the results of our study are likely to be relevant also for VC markets beyond Germany.

3.2 Measures

3.2.1 Dependent variable and empirical design

The duration between successive financing rounds is the dependent variable in estimating a Weibull duration model using robust standard errors (Gompers 1995). To get an accurate estimate of durations in-between capital injections, the sample under consideration uses only firms that have been subject to at least two rounds of VC financing. Firms then appear in the dataset as often as they receive financing. Of the aforementioned 2,373 financing events, a large fraction of ventures only received a single round of financing (whether by a single VC or a syndicate of VCs). Moreover, because we control for the amount provided (which is not always available) the sample drops to 431 financing events, of which 266 involve a second round of financing, at least.

Funded firms have a particular probability of receiving financing in a subsequent round. The instantaneous probability of receiving financing is modeled by a hazard rate that measures the probability of receiving funding between t and $t + \Delta t$ over the probability of receiving funding after t. The distribution of the hazard rate presumably follows a Weibull distribution. Other distributions did not qualitatively affect the signs of coefficients estimated. Unlike Gompers, this study models the likelihood of receiving financing using the number of days between financing events, rather than months and estimates the coefficients using the method of maximum likelihood. Moreover, we explicitly control for sample-selection biases using a Heckman (1979) type adjustment. Positive coefficients shown in the tables indicate longer average times between financing. Table 2 displays coefficients rather than exponentiated coefficients (hazard ratios). The hazard for all models estimated increases monotonically, indicating that the more time elapses, the greater the probability of receiving additional funding.

3.2.2 Testing for biases

Censoring effects could arise from two eventualities. The first one could be investments into portfolio firms at the end of the analysis horizon. Deals in 2004–2005 could be subject to censoring, as it was not yet possible to observe the next financing round, so these deals do not appear in the study. Second, it could follow from a firm's bankruptcy, either because it was not solvent long enough to obtain a new round of financing, or because VCs were reluctant to provide one. To

avoid these censoring effects, the regressions are re-estimated using a year dummy for the year of the first investment and focus only on active firms in the sample. (The German Commercial register provided bankruptcy data.) It turns out that none of the time dummy variables is robustly significant. Focusing only on active firms does not affect the results shown: neither signs nor coefficients change noticeably. Therefore, in the following, the results from the full regression specifications appear.

We additionally control for selection effects and endogeneity that could bias our estimates. In general, sample selection bias refers to problems where the dependent variable (interval between financing rounds) is observed only for a restricted, nonrandom sample (here only for those ventures that underwent a second round of financing). Hence, one observes the duration only if the VCs decide to provide an additional financing tranche. As opposed to previous work, we control for sample selection biases by employing a Heckman (1979) type selection model. In fact, firms that are subject to a second round of financing might be of higher quality and more successful, and therefore need less monitoring. Hence, once needs to account for factors driving staging patterns in the first place, to allow for an unbiased analysis of the effect of industry experience on monitoring frequency and intensity. We therefore provide a selection model in Table 2, that accounts for observable characteristics of the underlying venture and use the model subsequently to calculate the inverse of Mills-Ratio to control for other unobservable confounders for the duration models provided (Heckman 1979; Lee 1982; Hamilton and Nickerson 2003).

Moreover, endogeneity refers to the fact that an independent variable included in the model is potentially a choice variable, correlated with unobservables relegated to the error term. The dependent variable, however, is observed for all observations in the data. This could likely be the case for our syndication variables. Characteristics of the investment opportunity (size of the deal, the riskness of the venture) affect whether or not syndication is warranted. Hence, syndication is endogenous to characteristics of the underlying venture. In fact, the extant literature suggests that syndication might be driven by the need to spread risk or combine managerial resources (Hochberg et al. 2007; Lerner 1994). Hence, the decision to join forces with a partner might be non-random. Ignoring that fact might lead to biased estimates (Greene 2008). Following the argumentation in Villalonga (2004), this study calculates treatment effects among the two different groups of firms (the treatment group where VCs opted for syndication, and the control group where one VC acted as a solo investor) to make causal inferences about a VC's propensity to syndicate, and the subsequent impact on monitoring intensity. The effect of syndication decisions on the length of financing rounds is the difference between the average financing duration for a firm financed by a syndicate and the length of the financing round had it not been financed by a syndicate. Assuming that syndication decisions of VCs are a function of observable variables (size of the investment, age of the firm, type of round etc.), matching methods can eliminate the bias due to selection on observables. Matching is based on the stage of the investment dummies, the industry dummies, the age of the firm at each investment round, the number of investors, the amount of financing provided, and the propensity to stage the investment in the first place. Nearest neighbor matching serves to estimate the counterfactual, as Abadie and Imbens (2002) recommend. Table 3 reports the

average treatment effect (ATE) and the average treatment effect on the treated (ATT). The ATE measures the expected impact of syndication on the length of the financing rounds and on the amount provided on a randomly selected firm from the sample. The ATE is the average syndication effect across the whole population of VC-financed firms in the sample. Meanwhile, the ATT estimates the impact of syndication on the length of financing rounds (and the amount provided) only for those firms that received financing from a syndicate of VCs. The ATT is the average change in financing round length due to syndication for those firms that were subject to syndication (Wooldridge 2006).

3.3 Independent variables

3.3.1 Industry experience

To calculate our measures of industry investment experience for the VCs, we include information on the industries that the funded firms are active in. This also makes it possible to match the experience to the underlying industry in which a deal takes place. Hence, we can map the knowledge previously acquired by the VCs in transactions prior to the current investment target. Based on information from TVE, we identify the industry of a particular venture by applying the Venture Economics Industry Classification (VEIC), a Venture Economics proprietary industry classification scheme. To draw more distinct conclusions, we split the industries further, which results in finer industry clusters. For example, we divide the Medical/Health classification into two separate categories. In addition, we split the Industrial Sector into Industrial Products (such as Chemicals and Industrial Equipment) and Industrial Services (such as Transportation, Logistics and Manufacturing Services). A category for Internet Firms is introduced to cope with the particularities of investments into New Economy firms over the period. Groupings have been made based on VEIC Level 1 codes. Firms that were solely focusing on the Internet to sell and market products were included in the separate Internet/E-Commerce category. Concerning Hypothesis 1 and the impact of industry experience on the intensity of monitoring, the investment experience (in the industry in which the funded firm is active) of the VCs involved until the end of the previous year (t-1 Analysis) is calculated. When a syndicate of VCs undertakes the investment, the total number of transactions that the lead investors as well as the partners invested in (until the end of the previous year), are summed up. The use of aggregated experience differs from, for example, Hsu's (2004), approach, which uses only the experience of the lead investor when a syndicate finances entrepreneurs and the one taken in Li (2008) that employs experience relative to the industry (albeit duration is measured in absolute terms and not relative to the industry, making the results difficult to interpret accordingly). The present study accounts for the fact that what characterizes syndication is the combination of resources (such as industry experience and financial resources) for the mutual benefit of the partners (Hochberg et al. 2007; Lerner 1994). By focusing solely on the lead investor, one loses valuable information that determines the underlying nature of cooperation among VCs. Accordingly, it is the industry investment experience embedded in the syndicate,

and not solely in the lead VC, that most enhances our understanding of how resources and capabilities affect the incentives to monitor subsequently.

3.3.2 First round syndication (dummy)

The study includes a dummy variable equaling one when a syndicate provides the investment in the first round, and zero otherwise, to test for Lerner's (1994) selection hypothesis and Manigart et al.'s (2005) notion of risk-spreading in early investments. Sourcing high quality deals or reducing the risk of investing early on might negatively impact the incentives to monitor the investment more closely.

3.3.3 Subsequent round syndication (dummy)

The study includes a dummy variable indicating whether a syndicate of VCs provides financing in a subsequent round. If a syndicate finances a subsequent round, the variable takes on the value of one, and zero otherwise. VCs investing in syndicates might benefit from processing information more efficiently when making continuation/abandonment decisions and hence, monitor less closely.

3.3.4 Cumulated previous syndicated rounds

The empirical methodology also cumulates the number of previously syndicated financing events. The variable sums over all previous syndicated financing rounds for a given firm and proxies for more effective work and decision routines in all previous rounds that could help to reduce information asymmetries in the given round of financing. VCs investing in the given round could capitalize on previous syndication efforts.

3.4 Control variables

In more uncertain environments VCs are more likely to encounter unforeseen contingencies, and benefit more from staging capital infusions. For funded firms that possess substantial intangible assets, and whose products are far from commercialization, these problems become even more severe (Gompers and Lerner 2002). Gompers (1995) points out that because early stage companies have short or nonexistent corporate histories, the evaluation of their growth prospects is even more difficult in these phases. When conflicts with the entrepreneur are more likely, and the outcome is more uncertain, the value added through oversight should be higher (Gompers 1995; Sahlman 1990). Hence, the approach followed controls for firm age, sales of the firms, and the stage of investment.

3.4.1 Funded firm age and sales

As Bygrave (1987) points out, younger firms are more likely to fail, and, consequently, the age of a firm at the time of investment can serve as a proxy for the riskiness of a venture. Age is the difference between the funded firms' founding date

and the investment date. Moreover, we control for the levels of sales and age of the firm at the first investment date in our selection equation.

3.4.2 Stage of development

TVE gives information about five different stage categories: Start Up/Seed, Early Stage, Expansion, Later Stage and Other. Like Gompers (1995), who labels the categories for bridge, second and third stage financing as "Late Stage" financing, this study combines the TVE categories of Expansion, Later Stage and Other to form a new category, "Late Stage". As no clear distinction between expansion financing (which almost always occurs in later phases) and other financing activities (namely bridge financing or special purpose financing) from the "Later Stage" category is obvious, this combination appears to be the most reasonable classification scheme. The dummy variables take on the value of one if the stage of development belongs to one of the aforementioned categories, and zero otherwise.

3.4.3 Industry dummies

The study controls for industry characteristics by using the Venture Economics Industry Classification, a Venture Economics proprietary industry classification scheme. In order to draw more distinct conclusions, the industries are further separated in the sample, which results in finer industry clusters. The Medical/Health classification is split into two separate categories. The Industrial Sector is further split into Industrial Products (such as Chemicals and Industrial Equipment) and Industrial Services (such as Transportation, Logistics and Manufacturing Services). Categories for Software and Internet Firms to cope with the particularities of investments into "New Economy" firms over the period are introduced.

3.4.4 Amount of financing provided

To accommodate the size of the transaction we included the average amount provided for each transaction. The average amount of financing is included in all regressions and is the sum provided per round divided by the corresponding number of VCs involved in a transaction.

3.4.5 Number of investors

To control for the potential influence of partners within the syndicate, we also include the number of VCs that have invested capital into the financed venture including the subsequent and previous rounds.

4 Results

Table 1 provides the correlation matrix and descriptive statistics. The average duration of financing rounds is 295 days, with a standard deviation of 370.

Table 1 Descriptive statistics and correlation matrix duration analysis

	Mean	1	2	3	4	5	6	7	8	9	10	11
1. Duration	296											
2. Total amount provided	7.87	0.12										
3. First round syndication	0.51	0.19	0.17									
4. Subsequent round syndication	0.50	0.23	0.22	0.80								
5. Cum. number syndicated rounds	0.78	0.24	0.20	0.71	0.68							
6. Industry experience	10	0.12	0.09	0.27	0.26	0.61						
7. No. of investors	2.16	0.25	0.48	0.52	0.67	0.64	0.45					
8. Start-up/seed stage	0.12	0.10	-0.01	0.05	0.05	0.08	0.09	0.06				
9. Early stage	0.40	0.05	0.01	0.17	0.10	0.22	0.07	0.19	−0.32			
10. Later stage	0.48	0.04	0.14	0.06	0.05	0.24	0.19	0.10	−0.17	−0.32		
11. Age at 1st inv.	3.48	−0.08	−0.04	−0.15	−0.12	−0.13	−0.07	−0.10	−0.07	−0.12	0.14	
12. Sales at 1st inv.	7,601	−0.04	−0.01	−0.05	−0.05	−0.04	−0.03	−0.03	−0.02	−0.05	0.06	0.79
13. Age at inv.	6.43	0.02	−0.01	0.02	0.03	0.00	−0.01	0.07	−0.03	0.04	−0.01	0.20
14. Biotech	0.29	0.22	0.07	0.24	0.24	0.39	0.55	0.35	0.12	0.12	−0.02	−0.13
15. Computer	0.05	−0.04	−0.06	0.00	−0.05	−0.06	−0.12	−0.10	−0.05	0.03	0.03	0.02
16. Electronics	0.13	−0.08	−0.02	0.00	0.00	−0.02	−0.16	−0.05	−0.01	0.05	−0.03	0.00
17. Industrial services	0.02	−0.04	−0.05	−0.12	−0.08	−0.09	−0.08	−0.08	−0.06	−0.02	0.04	0.17
18. Industrial products	0.04	−0.06	−0.04	−0.04	−0.04	−0.09	−0.12	−0.07	0.01	−0.08	−0.04	0.21
19. Internet	0.12	−0.04	0.14	−0.11	−0.08	−0.14	−0.18	−0.07	0.00	0.05	−0.07	−0.09
20. Life science/pharma	0.05	0.01	0.01	0.01	0.03	−0.02	−0.08	0.06	−0.06	0.02	−0.11	−0.02
21. Medical products	0.04	0.00	0.01	0.06	−0.06	−0.03	−0.10	−0.07	−0.05	0.01	0.10	0.01
22. Communication	0.03	−0.12	−0.05	−0.11	−0.11	−0.12	−0.09	−0.09	−0.07	−0.11	0.05	−0.03
23. Software	0.23	−0.04	−0.09	−0.11	−0.07	−0.12	−0.07	−0.14	0.00	−0.15	0.07	0.06

Table 1 continued

	Mean	12	13	14	15	16	17	18	19	20	21	22
1. Duration	296											
2. Total Amount provided	7.87											
3. First round syndication	0.51											
4. Subsequent round syndication	0.50											
5. Cum. number syndicated rounds	0.78											
6. Industry experience	10											
7. No. of investors	2.16											
8. Start-up/seed stage	0.12											
9. Early stage	0.40											
10. Later stage	0.48											
11. Age at 1st inv.	3.48											
12. Sales at 1st inv.	7,601											
13. Age at inv.	6.43	0.16										
14. Biotech	0.29	−0.04	0.06									
15. Computer	0.05	−0.01	−0.01	−0.14								
16. Electronics	0.13	−0.03	−0.02	−0.25	−0.09							
17. Industrial services	0.02	−0.01	0.02	−0.09	−0.03	−0.06						
18. Industrial products	0.04	0.23	0.03	−0.14	−0.05	−0.08	−0.03					
19. Internet	0.12	−0.02	−0.04	−0.24	−0.08	−0.15	−0.05	−0.08				
20. Life science/pharma	0.05	−0.02	−0.01	−0.14	−0.05	−0.09	−0.03	−0.05	−0.08			
21. Medical products	0.04	0.00	0.00	−0.13	−0.04	−0.08	−0.03	−0.04	−0.08	−0.05		
22. Communication	0.03	0.02	−0.02	−0.11	−0.04	−0.07	−0.02	−0.04	−0.06	−0.04	−0.03	
23. Software	0.23	−0.02	−0.02	−0.35	−0.12	−0.21	−0.08	−0.12	−0.20	−0.12	−0.11	−0.09

Summary statistics and correlation matrix are based on 431 observations. All correlations above 0.1 are significant at least at the 5 % level

The average firm is about 3.4 years old when the first round of financing takes place, with a minimum of zero (indicating that the firm comes into existence with the capital infusion). 12 % of the total transactions take place in the start-up stage, 40 % of the transactions in the early stage, and some 50 % in the late stage. With respect to industry experience, one can infer that VCs gained theirs through an average of 10 transactions within the transaction relevant industry, with a standard deviation of around 18. First round syndication seems to be quite pronounced: around 50 % of the funded firms have a first round where two or more VCs inject capital. However, because of the presence of firms with multiple rounds, this number is biased towards firms with an initial syndicated round and subsequent financing rounds, as the first round syndication dummy is accounted for in all subsequent financing events for the same company. The cumulated number of syndicated rounds indicates that the analyzed funded firms have on average 0.78 rounds that have previously been subject to syndication. In fact, this finding does not imply that almost 80 % of all funded firms have been subject to syndication; overall, only 60 % of all funded firms are financed by multiple VCs. Again, given that firms are accounted for as often as they receive financing, these numbers might be misleading at first glance. The industry dummies show a larger presence of Biotech and Software firms in the two samples. The correlations among the variables show a few problems of multicollinearity. Notably, the various syndication measures are correlated. In all regressions estimated, the variance inflation factors are, on average, around 2.5–2.9, thus showing no sign of problems with multicollinearity and are well below the critical thresholds. Noteworthy, only the first round syndication dummy exhibits a relatively high variance inflation factor when included with all remaining syndication variables. Naturally, the cumulative syndication variable and the first round are correlated. In order to cope with collinear variables, we include them separately into the regressions first, and include a full model in column 7 to report the significances when all effects are included in the same model (Hair et al. 2005).

Column 1 in Table 2 reports the results of the selection model. Here, the dependent variable takes on the value of one if staging takes place, and equals zero otherwise. The model controls for observable characteristics that likely foster the propensity to stage the investment. Moreover, we use the model to calculate the inverse Mills-Ratio to control for other unobservable confounders in the duration models reported in columns 2 to 7. One can observe that the amount provided is positive and statistically significant (selection model: $\beta = 0.05$; $p < 0.1$). Accordingly, the selection equation finds evidence for staging as a tool to mitigate the risk involved in VC financing through splitting the amount across various stages, rather than providing a lump-sum payment upfront. Hence, the deals for which we report the results from the duration model are among the larger ones. Moreover, among the industry dummies only Biotech is positive and statistically significant (selection model: $\beta = 0.30$; $p < 0.05$). Industry characteristics, such as development process for medical applications and corresponding government approval milestones likely drive the staging pattern. Lastly, we can observe that when the first round investment is provided by a syndicate of VCs, staging is more likely to take place. The coefficient associated with the first round syndication dummy is positive and

Table 2 Selection and outcome equation for Weibull Duration Model

	(1) Selection model	(2) Model 1	(3) Model 2	(4) Model 3	(5) Model 4	(6) Model 5	(7) Model 6
First round syndication	0.142**	−0.124					−0.016
	(0.009)	(0.614)					(0.959)
Subsequent round syndication			−0.329				−0.303
			(0.135)				(0.215)
Cum. number syndicated rounds				0.112			0.057
				(0.208)			(0.609)
Industry experience					0.012**		0.010*
					(0.006)		(0.044)
Ln (industry experience)						0.171*	
						(0.040)	
No. of investors		−0.007	0.025	−0.038	−0.051	−0.041	−0.019
		(0.857)	(0.589)	(0.351)	(0.240)	(0.366)	(0.694)
Amount provided	0.050*	−0.103	−0.112	−0.056	−0.060	−0.106	−0.090
	(0.018)	(0.204)	(0.151)	(0.449)	(0.414)	(0.268)	(0.261)
Start-up/seed stage	0.109	−0.183	−0.265	−0.091	−0.078	−0.025	−0.206
	(0.117)	(0.385)	(0.190)	(0.604)	(0.652)	(0.898)	(0.334)
Early stage	0.146**	0.061	−0.007	0.179	0.157	0.119	0.031
	(0.007)	(0.799)	(0.974)	(0.358)	(0.412)	(0.569)	(0.895)
Age at 1st inv.	−0.005						
	(0.251)						
Sales at 1st inv.	0.000						
	(0.465)						
Age at inv.		−0.000	−0.000	0.000	0.000	0.000	0.000
		(0.986)	(1.000)	(0.804)	(0.161)	(0.323)	(0.136)
Biotech	0.304**	−0.304	−0.391	−0.136	−0.331	−0.324	−0.467
	(0.001)	(0.342)	(0.150)	(0.573)	(0.224)	(0.293)	(0.174)
Computer	0.134	0.313	0.302	0.320	0.400+	0.583*	0.390+
	(0.282)	(0.179)	(0.188)	(0.172)	(0.099)	(0.049)	(0.097)
Electronics	0.104	0.327	0.346	0.307	0.386	0.396	0.400
	(0.364)	(0.163)	(0.150)	(0.182)	(0.114)	(0.166)	(0.103)
Industrial products	0.044	−0.029	0.040	−0.070	−0.010		
	(0.810)	(0.916)	(0.885)	(0.800)	(0.972)		
Internet	0.123	0.064	0.088	0.109	0.176	0.210	0.175
	(0.281)	(0.820)	(0.742)	(0.709)	(0.543)	(0.521)	(0.507)
Life science/pharma	0.204+	−0.136	−0.213	−0.014	0.065	0.176	−0.047
	(0.068)	(0.667)	(0.500)	(0.963)	(0.832)	(0.617)	(0.883)
Medical products	−0.025	0.104	0.011	−0.064	0.049	0.019	0.028
	(0.894)	(0.837)	(0.982)	(0.885)	(0.912)	(0.969)	(0.959)
Mills ratio		−0.972	−1.201	−0.327	−0.509	−0.683	−0.962
		(0.336)	(0.110)	(0.623)	(0.407)	(0.372)	(0.330)
Chi-square	70.61	90.98	90.49	100.99	99.86	335.66	103.47
$p >$ chi-square	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Table 2 continued

	(1) Selection model	(2) Model 1	(3) Model 2	(4) Model 3	(5) Model 4	(6) Model 5	(7) Model 6
Observations	431	266	266	266	266	214	266

p-values in parentheses * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 2 reports a Weibull duration model using robust Standard Errors estimating the impact of portfolio firm characteristics on the length of individual financing rounds. The industry dummy for Software has been dropped in all regression specifications to avoid perfect collinearity. The first column reports the selection equation with the zero/variable staging as the dependent variable. The Mills-Ratio used in models 1 to 6 is calculated from the selection equation in accordance with Heckman (1979), Lee (1982) and Hamilton and Nickerson (2003)

statistically significant (selection model: $\beta = 0.14$; $p < 0.05$). This provides some evidence for selection effects, such that syndicated investment are more likely to make it through another round of financing, while others might fail to survive through the first round investment. All in all, the selection equation documents evidence that staging by itself is a not a random assignment and one needs to control for the underlying antecedents of stage financing to make causal inferences about monitoring intensity conditional on first round selection and risk-spreading among VCs.

Columns 2 to 7 report the results of the Weibull duration models. Firstly, we include the inverse Mills-Ratio to control for self-selections in all equations. Calculations are done in accordance with Heckman (1979), Lee (1982), and Hamilton and Nickerson (2003). Noticeably, the coefficient associated with the Mills-Ratio is not statistically significant in all models estimated. Hence, there is no further evidence for selection on unobservable confounders that affects the assignment to stage financing in the first place. Accordingly, we capture the determinants of stage financing by including the amount provided, syndication, and the stage of investment as well as industry dummies in our selection equation.

With respect to Hypothesis 1, which argues that VCs can use their investment experience to create governance capabilities that negatively affect the time in-between financing rounds, Table 2 reveals that the coefficient associated with the industry experience of the corresponding VC (plus partner(s) in the case of a syndicate) has a positive and significant (model 4: $\beta = 0.01$; $p < 0.05$) effect on the duration of financing rounds. We also control for non-linear effects and find that when controlling for the natural logarithm of investment experience, the coefficient is positive and remains significant (model 5: $\beta = 0.17$; $p < 0.1$). Lastly, when using all syndication and experience measures at the same time, the coefficient associated with industry experience is positive and significant (model 6: $\beta = 0.01$; $p < 0.1$). Hence, the results report strong evidence for our hypothesis 1 that industry experience can enable VCs to better anticipate future contractual hazards and reduces the incentive to monitor the entrepreneur more closely.

Turning to Hypothesis 2, neither the dummy indicating whether the first round of financing was subject to syndication nor the dummy equaling one when the subsequent round of financing was subject to syndication is significant at conventional levels. This result indicates no significant impact of syndication

Table 3 Treatment effects for syndication measures

	ATE	ATT
Subsequent round syndication	298.98***	134.80**
	(56.110)	(66.71)
First round syndication	160.99***	171.75**
	(54.44)	(68.59)
Observations	431	431

* $p < 0.1$, **$p < 0.05$, ***$p < 0.01$. Tests are two-tailed

Table 3 shows the average treatment effect (ATE) and average treatment effect on the treated (ATT) for the treatment group (subject to first or subsequent round syndication) and the corresponding standard errors. The dependent variable is the time interval between financing events. Nearest neighbor matching as per Abadie (2002) is applied based on the stage of investment, the industry active in, the age at investment, the number of investors, the average amount provided, and the Mills Ratio from the selection equation

decisions on the implementation of governance choices. Turning towards the cumulative number of syndicated rounds we find again no significant effect of syndication on the duration of financing rounds.

However, as argued previously, syndication might again present a non-random assignment and is likely a choice variable of VCs. The pooling of investment experience or the need to spread financial risks might be influenced by the underlying characteristics of the investment they are about to make, and hence, syndication is driven by characteristics of the investment. VCs syndicate whenever they anticipate benefits concerning a potential value-added or the spreading of risks involved. Accordingly, in Table 3 we document evidence of the effect of syndication when syndication is endogenous to characteristics of the underlying venture.

Regarding the possible impact of endogenous syndication decisions on the length of financing rounds, Table 3 shows that both the average treatment effect and the average treatment effect on the treated for first round syndication is positive and statistically significant ($p < 0.01$ and $p < 0.05$, respectively). Hence, less intense monitoring takes place, when VCs syndicate in the first round of financing. In line with our arguments provided, due to the spreading of risks in first round investments, incentives to monitor the investment are reduced and hence, the length of financing rounds increases. In sum, the average effect is some 130 days longer for investments subject to syndication (ATT), and about 300 days for an average firm from the dataset (ATE). This provides also some evidence that firms subject to syndication stand the test of time longer and make it to another round of financing, providing some evidence for potential performance effects of VC selection in first round investments.

Moreover, we argued that during later rounds of financing VCs aim at pooling their industry experience to benefit the entrepreneurial firm through better advice and therefore incentives to monitor would also be less pronounced. Table 3 shows that the average effect is some 160 days longer for investments subject to syndication (ATT), and about 171 days for an average firm from the dataset (ATE).

Again, syndication reduces incentives to monitor and subsequently, the length in-between financing rounds increases. To sum up, when treating syndication as choice variable, we find strong support for our hypothesis 2 that syndication helps to spread risk and combine experience for value-added advice and correspondingly incentives to monitor are reduced.

5 Discussion

In this paper we analyze governance modes in entrepreneurial financing in relation to the investment experience of the VCs. In particular, we focus on monitoring intensity of venture capitalists.

The results suggest that the length of time between successive capital injections increase when the financing VC(s) have more industry experience. The industry experience that VCs derive from relevant previous investments lowers the need for close monitoring of the financed firm. Correspondingly, they can implement a less protective form of governance. When more industry expertise is involved in the continuation/abandonment decision in a specific round the length of the financing round increases. Industry experience appears to help to better define roles and responsibilities, identify future milestones and appropriate financial incentives. Hence, the results further accentuate the interaction of firm-level and transaction-specific characteristics (Nielsen 2010; Ness and Haugland 2005).

Noticeably, we differ in our estimation from other studies, among others Campbell and Frye (2009) or Sapienza et al. (1996), who find that more experienced (high quality) VCs rely on more intense monitoring than less experienced ones. While Campbell and Frye (2009) focus on late stage, IPO firms, we study younger firms in our analysis. Hence, monitoring and governance to secure a vested financial interest in an IPO to avoid underpricing or prevent the safeguarding of private benefits of control by executives are not studied in this paper. However, analyzing how governance structures and the incentives to monitor evolve over time, and subsequently change with the inclusion of other outside investors, would be a worthwhile endeavor to understand under which circumstances which forms of governance are more appropriate. Eventually, one should see a transition in governance mechanisms which would extend our results even further. Moreover, we specifically measure the time in-between financing rounds as a monitoring device, rather than interactions with corporate executives, which might proxy for both, monitoring and value added advice simultaneously. Accordingly, our results carry information about the impact of VC ability on monitoring apart from potential value-added advice. Hence, our results provide support, that better VC abilities influence monitoring mechanisms and complement previous work on VC abilities that provide better quality of managerial advice. The combination of these two abilities makes VCs more successful when financing new ventures.

We also test for the effect of syndication on the duration of financing rounds. We explicitly deal with potential problems of self-selection and endogeneity. In sum, we find robust evidence for our hypothesis. When considering syndication within the first and subsequent round of investment as an endogenous choice variable based on

round characteristics, we can infer that syndication can generally lead to less monitoring and lengthens the time in-between financing rounds subsequently. Moreover, our results highlight the need to treat syndication as a choice variable and when bearing in mind, why and when VCs opt for syndication, one is able to make causal inferences about the impact of syndication. Without endogeneity adjustment, our data reveals no impact of syndication on monitoring frequency and intensity (Table 2). However, when making syndication endogenous to the characteristics of the underlying firm (Table 3) syndication in the first round and in subsequent rounds positively impacts the duration of financing rounds and induces less intense monitoring of portfolio firms. Our results are consistent with risk-spreading (for the effect of first round syndication) and value-added theories in deal selection and in the due course of the investment relationship (for subsequent round syndication).

6 Limitations and extensions

A topic for further study could be the impact of information sharing and trust between the involved VCs that can create a foundation for future cooperation. Closer and more effective collaboration among the involved VCs could further affect the incentives to monitor. Repeated relationships, for example, might transfer expectations about the partner's behavior from a prior deal to the new transaction. In this way, a social relationship can motivate both parties to behave in a fair and trusting manner toward each other and result in a transaction becoming a more effective situation of mutual gain, rather than only of self-interest (Boersma et al. 2003). Continuous collaboration between VCs could lead to established working and decision routines that facilitate the sharing of industry experience and improve the continuation/abandonment decisions and call for less restrictive governance.

Another issue worthwhile to study is the interaction between a VC's industry experience, the quality of accounting information and the time interval between financing rounds. We assume VCs have access to accounting information of identical quality and find that more experienced VCs opt for longer periods between financing rounds. Given that more experienced VCs assist their funded firms to produce better quality financial reports (Agrawal and Cooper 2010) it would be interesting to see to what extent the VCs' ability to evaluate accounting information or their ability to care for better quality information contribute to less stringent monitoring. A corresponding research question in the context of variable compensation based on accounting numbers appears relevant as well. Murphy and Oyer (2003) argue that accounting information should be used with discretion in performance evaluations. Based on the results of our study, more experienced evaluators could be better in inferring individual performance from available accounting figures. This might increase the perceived fairness of a performance evaluation system or allow for longer evaluation periods which would save costly time and effort to carry out frequent evaluations.

In this study, we did not test for potential performance implications of the governance choice implemented. Future research could direct itself towards the nexus between VC experience, governance choice and entrepreneurial performance.

Ultimately, VC transactions in inappropriate alignment should suffer from weaker performance, and chances of failure are potentially higher. In fact, analyzing the fit between transaction specific characteristics and organizational and governance fit could enhance understanding of value creation in VC financing (see, among others, Anderson (1998) and Leiblein et al. (2002)for an application in different areas).

Lastly, to further our understanding of the interaction between VC-level and transaction-specific characteristics, a possible expansion of this approach could consider the specific skills that VCs brought into a transaction (financial resources, management and marketing experience, technological expertise, etc.). This extension would also help clarify the role of complimentary partner skills brought about by syndication efforts and corresponding partner choices. Bringing extra skills beyond the skills of the lead investor into a financing relationship must certainly further mitigate contractual hazards.

7 Conclusions

This study analyzes the antecedents of monitoring frequency and intensity in VC financing. Given the highly exploratory character of VC financing, administrative control mechanisms can help investors cope with the inherent uncertainties in the VC–entrepreneur relationship. This study moves beyond analyzing pure transaction-specific characteristics, and incorporates characteristics of the financing VCs into the empirical analysis and documents an interactive contingency of monitoring intensity on the underlying transaction and VC-level characteristics. It links the presence of VC industry experience to the incentives to monitor the underlying venture.

We find that more industry experience allows for longer evaluation periods, i.e. less frequent and intense evaluation. A very likely factor is the ability to evaluate accounting information of funded firms. As opposed to the general (analytical) accounting research, where evaluators are mostly assumed to be fully rational and where learning through accumulating experience or other behavioral peculiarities cannot influence result, our results—in line with Cardinaels (2008) or McDaniel et al. (2002)—suggest that ability levels of evaluators or users of accounting information should be accounted for in the research of governance and performance evaluations, e.g. the decision between frequent or infrequent monitoring.

In addition, we also report evidence regarding the impact of VC syndication on incentives to monitor. In the first rounds of financing our results are consistent with the notion of risk spreading among VCs which subsequently leads to lower incentives to monitor and correspondingly, financing rounds observed are longer for investments subject to syndication. Moreover, when considering syndication in subsequent rounds, the related literature argues for value-added advice and better pooling of signals to improve continuation/abandonment decisions. In light of these theoretical works, our results provide consistent evidence that syndication in later rounds again lowers incentives to monitor and the length of financing rounds increases in turn. Accordingly, we provide evidence that syndication can help to combine information signals for good and improve confidence in continuation/

abandonment decisions. Hence, we document that syndication can alter the frequency and intensity of monitoring activities if two or more VCs seek to overcome discrepancies between industry experience and the characteristics of the investment, let it be to spread risks or provide value-added advice and improve financing decisions.

In sum, our results strongly support the view in Williamson (1985) that governance is not about one possible "best" structure, but rather which structure is most suitable for a venture capital firm (with certain characteristics) organizing a transaction (with its own characteristics). Hence, strategies implemented are conditional on one's own experience in comparison to the underlying investment.

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